

## CLAIMS

What is claimed is:

- 5           1    A method for optimizing private network file transfers in a peer-to-peer public network, the peer-to-peer public network including a plurality of nodes, wherein at least two of the node are part of a same private network, the method comprising the steps of:
- 10               (a)    receiving a search request from a first node for a file;
- (b)    determining that the file is stored on a second node;
- (c)    determining that the first and second nodes are part of the same private network; and
- (d)    using the second node to transfer the file to the first node over the private network instead of the public network.
- 15           2    The method of claim 1 further wherein step (a) includes the step of registering a client IP address, a subnet mask, and a peer IP address of both the first and second nodes with a server.
- 20           3    The method of claim 2 wherein step (a) further includes the step of registering with the server whether network address translation (NAT) has been performed on the first and second nodes and whether the first and

second nodes are directly reachable from other nodes on the public network or unreachable.

- 4 The method of claim 3 wherein step (a) further includes the step of  
5 determining that NAT has been performed on a particular node when the  
node's client IP address does not match the node's peer IP address.
- 5 The method of claim 4 wherein step (a) further includes the step of  
determining that a particular node is directly reachable from other nodes on  
the public network when the server can connect with the node using the  
node's client IP address.
- 6 The method of claim 2 wherein step (a) further includes the step of storing  
the client IP address, a subnet mask, and a peer IP address of both the first  
and second nodes in a node registry.
- 7 The method of claim 1 wherein step (a) further includes the step of allowing a  
user of the first node to enter search terms for finding a particular file.
- 20 8 The method of claim 7 wherein step (b) further includes the steps of querying  
a database containing file names with the search terms to find file names  
matching the search terms, and by identifying nodes containing the matching  
file, including the second node.

9 The method of claim 4 wherein step (c) further includes the steps of:

(i) determining that the second node is part of the same private network as the first node, and therefore locally reachable by the first node, when

(1) NAT has been performed on both the first and second nodes and at the peer IDs of both the first and second nodes match, or

(2) NAT has not been performed on either the first and second nodes and the subnet IDs of each first and second nodes match.

10 The method of claim 9 wherein step (c) further includes the steps of:

(ii) returning a list of search results from the server to the first node, where the list includes the identities and addresses of the matching nodes, IP addresses, and subnet masks.

11 The method of claim 10 wherein step (c)(ii) further includes the step of sorting the search results first by locally reachable nodes followed by the directly reachable nodes.

12 The method of claim 10 wherein step (d) further includes the steps of:

(i) using the client IP address of the second node to send a request for the file from the first node to the second node; and

- (ii) sending the file from the second node to the first node using the client IP address of the first node.

5 13 A peer-to-peer public network, comprising  
at least one server coupled to the public network;  
a first plurality of nodes coupled to the public network;  
a private network including first and second nodes coupled to the public  
network, wherein when the server receives a search request from the first node  
for a file, the server

determines that the file is stored on the second node,

determines that the first and second nodes are part of the same  
private network, and

15 instructs the first node to request the file from the second node, such  
that the file is transferred from the second node to the first node over the  
private network instead of the public network.

14 The network of claim 13 wherein a client IP address, a subnet mask, and a  
peer IP address of both the first and second nodes are registered with the  
server.

20 15 The public network of claim 14 wherein the server registers whether network  
address translation (NAT) has been performed on the first and second nodes

and whether the first and second nodes are directly reachable from other nodes on the public network or unreachable.

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- 16 The public network of claim 15 wherein it is determined that NAT has been performed on a particular node when the node's client IP address does not match the node's peer IP address.
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- 17 The public network of claim 16 wherein it is determined that a particular node is directly reachable from other nodes on the public network when the server can connect with the node using the node's client IP address.
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- 18 The public network of claim 17 wherein the client IP address, a subnet mask, and a peer IP address of both the first and second nodes are stored in a node registry.
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- 19 The public network of claim 13 wherein a user of the first node enters search terms for finding a particular file.
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- 20 The public network of claim 18 wherein it is determined the file is stored on the second node by querying a database containing file names with the search terms to find file names matching the search terms, and by identifying nodes containing the matching file, including the second node.

21 The public network of claim 16 wherein it is determined that the second node is part of the same private network as the first node, and therefore locally reachable by the first node, when 1) NAT has been performed on both the first and second nodes and at the peer IDs of both the first and second nodes match, or 2) NAT has not been performed on either the first and second nodes and the subnet IDs of each first and second nodes match.

22 The public network of claim 21 wherein the server returns a list of search results is returned to the first node, where the list includes the identities and addresses of the matching nodes, IP addresses, and subnet masks.

23 The public network of claim 22 wherein the search results are sorted first by locally reachable nodes followed by the directly reachable nodes.

24 The public network of claim 22 wherein the client IP address of the second node is used to send a request for the file from the first node to the second node, and the file from the second node is sent to the first node using the client IP address of the first node.

25 A computer readable medium containing program instructions for optimizing private network file transfers in a peer-to-peer public network, the peer-to-peer public network including a plurality of nodes, wherein at least two of the node are part of a same private network, the program instructions for:

- (a) receiving a search request from a first node for a file;
- (b) determining that the file is stored on a second node;
- (c) determining that the first and second nodes are part of the same private network; and
- (d) using the second node to transfer the file to the first node over the private network instead of the public network.

26 The computer readable medium of claim 25 further wherein instruction (a) includes the instruction of registering a client IP address, a subnet mask, and a peer IP address of both the first and second nodes with a server.

27 The computer readable medium of claim 26 wherein instruction (a) further includes the instruction of registering with the server whether network address translation (NAT) has been performed on the first and second nodes and whether the first and second nodes are directly reachable from other nodes on the public network or unreachable.

28 The computer readable medium of claim 27 wherein instruction (a) further includes the instruction of determining that NAT has been performed on a particular node when the node's client IP address does not match the node's peer IP address.

29 The computer readable medium of claim 28 wherein instruction (a) further includes the instruction of determining that a particular node is directly reachable from other nodes on the public network when the server can connect with the node using the node's client IP address.

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30 The computer readable medium of claim 26 wherein instruction (a) further includes the instruction of storing the client IP address, a subnet mask, and a peer IP address of both the first and second nodes in a node registry.

31 The computer readable medium of claim 25 wherein instruction (a) further includes the instruction of allowing a user of the first node to enter search terms for finding a particular file.

32 The computer readable medium of claim 30 wherein instruction (b) further includes the instructions of querying a database containing file names with the search terms to find file names matching the search terms, and by identifying nodes containing the matching file, including the second node.

33 The computer readable medium of claim 28 wherein instruction (c) further includes the instructions of:

- (i) determining that the second node is part of the same private network as the first node, and therefore locally reachable by the first node, when



- (1) NAT has been performed on both the first and second nodes and at the peer IDs of both the first and second nodes match, or
- (2) NAT has not been performed on either the first and second nodes and the subnet IDs of each first and second nodes match.

34 The computer readable medium of claim 33 wherein instruction (c) further includes the instructions of:

- (ii) returning a list of search results from the server to the first node, where the list includes the identities and addresses of the matching nodes, IP addresses, and subnet masks.

35 The computer readable medium of claim 34 wherein instruction (c)(ii) further includes the instruction of sorting the search results first by locally reachable nodes followed by the directly reachable nodes.

36 The computer readable medium of claim 34 wherein instruction (d) further includes the instructions of:

- (i) using the client IP address of the second node to send a request for the file from the first node to the second node; and
- (ii) sending the file from the second node to the first node using the client IP address of the first node.

37 A method for optimizing private network file transfers in a peer-to-peer public network, the peer-to-peer public network including a plurality of nodes, wherein a first node and a second node are part of a same private network, the method comprising the steps of:

- 5 (a) registering with the server whether network address translation (NAT) has been performed on the first and second nodes and whether the first and second nodes are directly reachable from other nodes on the public network;
- (b) receiving a search request from the first node for a file;
- (c) determining that the file is stored on the second node;
- (d) determining that the second node is part of the same private network as the first node, and therefore locally reachable by the first node, when
- (i) NAT has been performed on both the first and second nodes and at the peer IDs of both the first and second nodes match, or
- (ii) NAT has not been performed on either the first and second nodes and the subnet IDs of each first and second nodes match.
- 20 (e) using the second node to transfer the file to the first node over the private network instead of the public network.

38 The method of claim 37 further wherein step (a) includes the step of registering a client IP address, a subnet mask, and a peer IP address of both the first and second nodes with a server.

5 39 The method of claim 38 wherein step (a) further includes the step of determining that NAT has been performed on a particular node when the node's client IP address does not match the node's peer IP address.

10 40 The method of claim 39 wherein step (a) further includes the step of determining that a particular node is directly reachable from other nodes on the public network when the server can connect with the node using the node's client IP address.

15 41 The method of claim 40 wherein step (d) further includes the step of returning a list of search results from the server to the first node, where the list includes the identities and addresses of the matching nodes, IP addresses, and subnet masks.

20 42 The method of claim 41 wherein step (d) further includes the step of sorting the search results first by locally reachable nodes followed by the directly reachable nodes.

43 The method of claim 42 wherein step (e) further includes the steps of:

- (i) using the client IP address of the second node to send a request for the file from the first node to the second node; and
- (ii) sending the file from the second node to the first node using the client IP address of the first node.